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EXAMINER	
KUMAR, PANKAJ	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/695,357	Applicant(s) BALACHANDRAN ET AL.	
	Examiner Pankaj Kumar	Art Unit 2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 2/23/2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *See Continuation Sheet* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27,30,41,44 and 49* is/are allowed.

6)☒ Claim(s) *1-3,5-9,11,12,14-19,21,22,24,25,28,29,31-33,35,36,38,39,42,43,45,46,48 and 50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/2000*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims pending in the application are 1-3,5-9,11,12,14-19,21,22,24,25,27-33,35,36,38,39,41-46 and 48-50.

DETAILED ACTION

1. Response to Arguments

2. New non-final based on new grounds of rejection.

3. Response to Amendment

4. Specification

5. The abstract of the disclosure is objected to because it should not contain the title of the invention. Correction is required. See MPEP § 608.01(b).

6. Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

8. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 2, 3, 5, 6, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eswara in view of Dent USPN 6,011,786. Here is how the references teach the claims:

10. As per claim 1: a cellular communication system, comprising: a plurality of base station transceivers (Eswara fig. 1: 18, 20, 22, 24, 26); at least one base station controller (Eswara fig. 1: 16) that is configured to control the plurality of base station transceivers (Eswara fig. 1: 16 controls 18, 20, 22, 24, 26); and a cell group that comprises a plurality of cells (Eswara fig. 1: 28, 30) that are respectively associated with the plurality of base station transceivers (Eswara fig. 1: 18, 20) and with a plurality of primary frequencies (Eswara col. 1 lines 27-28: "control channel frequency is used for each sector."; col. 1 lines 34-35: separate control channel for each sub-

sector; thus there are multiple control channels or frequencies. These are primary since the control channels provide system identity and configuration – Eswara col. 1 lines 46-48 – without which the rest of the system would not be able to function appropriately), such that in each of the plurality of cells (Eswara fig. 1: multiple hexagons) the respectively associated base station transceiver uses the respectively associated primary frequency to communicate control information (Eswara col. 1 lines 27-28: "control channel frequency is used for each sector."), communication of the control information being constrained to the respectively associated primary frequency (Eswara col. 1 lines 34-35: separate control channel for each sub-sector), and uses coordinated frequency hopping over the plurality of primary frequencies to communicate traffic information (Eswara col. 4 line 56 to col. 5 line 15: hopping between beacons A, B, C etc.) wherein each of the plurality of cells has predefined control time slots (Eswara col. 2 lines 10-15: "in a TDMA … cellular system, begins transmitting on a traffic channel … followed by a start measurement … on the … control channel") associated therewith that are used to communicate the control information and has predefined traffic time slots associated therewith that are used to communicate the traffic information (Eswara col. 2 lines 10-12: "in a TDMA … cellular system, begins transmitting on a traffic channel") and at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies (not in Eswara but would be obvious as explained below).

11. Eswara does not teach at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies. Dent teaches at least one idle time slot (Dent 6011786 fig. 8a,b,c;

fig. 5: col. 10 line 61 to col. 11 line 20: unassigned or idle in one of cells i) separates (Dent fig. 5 shows time frames tm+1, tm-1 before and after Ci) at least one of the predefined control time slots (Dent col. 10 lines 19-21: predefined through allocations of time window used to communicate control channel) from at least one of the predefined traffic time slots (Dent col. 10 lines 20-23: time window used to communicate traffic channels; fig. 8a,b,c: has predefined or assigned traffic channels, col. 10 lines 63-64: "assigned to a traffic channel"), which are associated with different primary frequencies (Dent figs. 8b, 8c; col. 11 lines 8-20: i associated with j and k which are at different frequency bands). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies as recited by the instant claims, because the combined teaching of Eswara with Dent suggest at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara with Dent because Eswara suggests control and traffic data (something broad) in general and Dent suggests the beneficial use of having an unassigned or idle time slot between control and traffic data to more easily acquire a channel and increase gain by not succumbing to loss and fading (Dent col. 10 line 61 to col. 11 line 20) in the analogous art of cellular systems.

12. As per claim 2, the cellular communication system as recited in Claim 1, wherein the coordinated frequency hopping is cyclical (Eswara col. 4 line 56 to col. 5 line 15: it is cyclical

since as a user moves between beacons, they can only move cyclically with respect to the beacons and thus the beacons will be hopped to cyclically).

13. As per claim 3, the cellular communication system as recited in Claim 1, wherein the coordinated frequency hopping is random (Eswara col. 4 line 56 to col. 5 line 15: it is random since it is based on signal strength which is random).

14. (103) As per claim 5, Eswara in view of Dent teaches the cellular communication system as recited in Claim 1. What Eswara in view of Dent does not teach is wherein the primary frequencies are non-contiguous. The office takes official notice that signal overlapping or aliasing with primary frequencies will be prevented, and thus result in better quality signal strength estimate, when signals are at non-contiguous frequencies since leakage will be prevented. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to modify the prior art teaching of Eswara in view of Dent with non-contiguous primary frequencies as recited by the instant claims, because Eswara in view of Dent suggests switching frequencies based on signal strength in the analogous art of communications and when non-contiguous frequencies are used, data from one frequency will not leak into a non-adjacent frequency and thus a better estimate of signal strength will result.

15. As per claim 6, the cellular communication system as recited in Claim 1, wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of primary frequencies (Eswara fig. 4: U/X exists in the same bandwidth as A, B, C, D).

16. (103) As per claim 7, Eswara in view of Dent teaches the cellular communication system as recited in Claim 6, wherein the primary frequencies are non-contiguous and are each

separated, one from another, by at least one of the frequencies associated with the auxiliary cellular communication system (Eswara fig. 4: U/X exists in the same bandwidth as A, B, C, D). What Eswara in view of Dent does not teach is wherein the primary frequencies are non-contiguous. The office takes official notice that signal overlapping or aliasing with primary frequencies will be prevented, and thus result in better quality signal strength estimate, when signals are at non-contiguous frequencies since leakage will be prevented. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to modify the prior art teaching of Eswara in view of Dent with non-contiguous primary frequencies as recited by the instant claims, because Eswara in view of Dent suggests switching frequencies based on signal strength in the analogous art of communications and when non-contiguous frequencies are used, data from one frequency will not leak into a non-adjacent frequency and thus a better estimate of signal strength will result.

17. Claims 9, 11, 12, 14, 15, 16, 17, 18, 19, 21, 22, 24, 25, 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eswara in view of Almgren USPN 6,298,081 and Dent.

18. (Eswara, Almgren, Dent) As per claim 9, a cellular communication system, comprising: a base station subsystem; and a mobile terminal that is configured to use a control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency, and is configured to use coordinated frequency hopping over a plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem (discussed with Eswara)

wherein the control information is exchanged during predefined control time slots (Eswara col. 2 lines 10-15: "in a TDMA … cellular system, begins transmitting on a traffic channel … followed by a start measurement … on the … control channel") and the traffic information is exchanged during predefined traffic time slots (Eswara col. 2 lines 10-12: "in a TDMA … cellular system, begins transmitting on a traffic channel").

19. Eswara does not teach wherein the base station subsystem is configured to transmit a hopping sequence to the mobile terminal using the control frequency. Almgren 6298081 teaches wherein the base station subsystem is configured to transmit a hopping sequence to the mobile terminal using the control frequency (Almgren abstract: "channel allocation means within the base station generates channel hopping sequences that are transmitted via a control channel (SACCH) to hopping sequence lists (204-206) in the mobile stations (MS1-MS3)").

20. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at wherein the base station subsystem is configured to transmit a hopping sequence to the mobile terminal using the control frequency as recited by the instant claims, because the combined teaching of Eswara with Almgren suggest wherein the base station subsystem is configured to transmit a hopping sequence to the mobile terminal using the control frequency as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara with Almgren because Eswara suggests hopping between beacons (something broad) in general and Almgren suggests the beneficial use of the base station subsystem being configured to transmit a hopping sequence to the mobile terminal using the control frequency (such as optimizing the use of channels, Almgren col. 4 line 64 to col. 5 line 10) in the analogous art of hopping.

21. Eswara does not teach at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies. Dent teaches at least one idle time slot (Dent 6011786 fig. 8a,b,c; fig. 5: col. 10 line 61 to col. 11 line 20: unassigned or idle in one of cells i) separates (Dent fig. 5 shows time frames tm+1, tm-1 before and after Ci) at least one of the predefined control time slots (Dent col. 10 lines 19-21: predefined through allocations of time window used to communicate control channel) from at least one of the predefined traffic time slots (Dent col. 10 lines 20-23: time window used to communicate traffic channels; fig. 8a,b,c: has predefined or assigned traffic channels, col. 10 lines 63-64: "assigned to a traffic channel"), which are associated with different primary frequencies (Dent figs. 8b, 8c; col. 11 lines 8-20: i associated with j and k which are at different frequency bands). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies as recited by the instant claims, because the combined teaching of Eswara with Dent suggest at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara with Dent because Eswara suggests control and traffic data (something broad) in general and Dent suggests the beneficial use of having an unassigned or idle time slot between control and traffic data to more easily acquire a channel and increase gain

by not succumbing to loss and fading (Dent col. 10 line 61 to col. 11 line 20) in the analogous art of cellular systems.

22. As per claim 11, the cellular communication system as recited in Claim 9, wherein the coordinated frequency hopping is cyclical (discussed with Eswara).

23. As per claim 12, the cellular communication system as recited in Claim 9, wherein the coordinated frequency hopping is random (discussed with Eswara).

24. As per claim 14, the cellular communication system as recited in Claim 9, wherein the plurality of traffic frequencies and the control frequency are mutually exclusive (Eswara: control frequencies only for control and traffic frequencies only for traffic and thus they are mutually exclusive; paragraph 7: control channel "provides the system identity").

25. (103) As per claim 15: The cellular communication system as recited in Claim 9, wherein the traffic frequencies are non-contiguous. (discussed with Eswara with Almgren)

26. As per claim 16, the cellular communication system as recited in Claim 9, wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of traffic frequencies. (discussed with Eswara)

27. (103) As per claim 17, Eswara in view of Almgren teaches the cellular communication system as recited in Claim 16, wherein the traffic frequencies are non-contiguous and are each separated, one from another, by at least one of the frequencies associated with the auxiliary cellular communication system. (discussed with Eswara with Almgren)

28. As per claim 18, the cellular communication system as recited in Claim 9, wherein the plurality of traffic frequencies comprise the control frequency (discussed with Eswara).

29. (Eswara, Almgren, Dent) As per claim 19, Eswara teaches a method of communication between a mobile terminal and a base station subsystem, comprising: assigning a control frequency to a cell in which the mobile terminal is located; using the control frequency to exchange control information between the mobile terminal and the base station subsystem (discussed up to here with Eswara), the exchange of control information being constrained to the control frequency (Eswara has control information only going through the control channels); assigning a plurality of traffic frequencies to the cell in which the mobile terminal is located; and using coordinated frequency hopping over the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem (remainder discussed with Eswara) wherein the control information is exchanged during predefined control time slots (Eswara col. 2 lines 10-15: "in a TDMA … cellular system, begins transmitting on a traffic channel … followed by a start measurement … on the … control channel") and the traffic information is exchanged during predefined traffic time slots (Eswara col. 2 lines 10-12: "in a TDMA … cellular system, begins transmitting on a traffic channel").

30. What Eswara does not teach is transmitting a hopping sequence to the mobile terminal using the control frequency. Almgren 6298081 teaches transmitting a hopping sequence to the mobile terminal using the control frequency (Almgren abstract: "channel allocation means within the base station generates channel hopping sequences that are transmitted via a control channel (SACCH) to hopping sequence lists (204-206) in the mobile stations (MS1-MS3)").

31. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at wherein the base station subsystem is configured to transmit a hopping sequence to the mobile terminal using the control frequency as recited by the instant claims,

because the combined teaching of Eswara with Almgren suggest wherein the base station subsystem is configured to transmit a hopping sequence to the mobile terminal using the control frequency as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara with Almgren because Eswara suggests hopping between beacons (something broad) in general and Almgren suggests the beneficial use of the base station subsystem being configured to transmit a hopping sequence to the mobile terminal using the control frequency (such as optimizing the use of channels, Almgren col. 4 line 64 to col. 5 line 10) in the analogous art of hopping.

32. Eswara does not teach at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies.

33. Dent teaches at least one idle time slot (Dent 6011786 fig. 8a,b,c; fig. 5: col. 10 line 61 to col. 11 line 20: unassigned or idle in one of cells i) separates (Dent fig. 5 shows time frames tm+1, tm-1 before and after Ci) at least one of the predefined control time slots (Dent col. 10 lines 19-21: predefined through allocations of time window used to communicate control channel) from at least one of the predefined traffic time slots (Dent col. 10 lines 20-23: time window used to communicate traffic channels; fig. 8a,b,c: has predefined or assigned traffic channels, col. 10 lines 63-64: "assigned to a traffic channel"), which are associated with different primary frequencies (Dent figs. 8b, 8c; col. 11 lines 8-20: i associated with j and k which are at different frequency bands).

34. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the at least one idle time slot separates at least one of the predefined

control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies as recited by the instant claims, because the combined teaching of Eswara with Dent suggest at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara with Dent because Eswara suggests control and traffic data (something broad) in general and Dent suggests the beneficial use of having an unassigned or idle time slot between control and traffic data to more easily acquire a channel and increase gain by not succumbing to loss and fading (Dent col. 10 line 61 to col. 11 line 20) in the analogous art of cellular systems.

35. As per claim 21, the method as recited in Claim 19, wherein the coordinated frequency hopping is cyclical (discussed with Eswara).

36. As per claim 22, the method as recited in Claim 19, wherein the coordinated frequency hopping is random (discussed with Eswara).

37. As per claim 24, the method as recited in Claim 19, wherein transmitting the hopping sequence to the mobile terminal using the control frequency comprises: transmitting the hopping sequence to the mobile terminal using a primary packet broadcast control channel (PBCCH), which is defined by the control frequency and at least one time slot (Eswara col. 1 lines 62-64: "One of the functions provided by the DCCH is to relay … channel allocations …"; frequency to hop to is determined based on signal strength; col. 2 lines 10-15: "in a TDMA … cellular system, begins transmitting on a traffic channel … followed by a start measurement … on the … control channel").

38. As per claim 25, the method as recited in Claim 19, wherein the plurality of traffic frequencies and the control frequency are mutually exclusive (discussed with Eswara).

39. As per claim 28, the method as recited in Claim 19, wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of traffic frequencies (discussed with Eswara).

40. As per claim 29, the method as recited in Claim 28, wherein the traffic frequencies are non-contiguous and are each separated, one from another, by at least one of the frequencies associated with the auxiliary cellular communication system (discussed with Eswara).

41. Claims 31, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eswara in view of Almgren and Dent as applied to claim 19 above, and further in view of Barany.

42. As per claim 31: The method recited in claim 19 is discussed above. What Eswara in view of Almgren and Dent does not teach is randomly selecting a frequency from each of the plurality of equivalence classes of frequencies; and using the randomly selected frequencies to communicate traffic information between the mobile terminal and the base station subsystem. What Barany teaches is randomly (Barany col. 14 lines 55-56: random access channel) selecting a frequency from each of the plurality of equivalence classes of frequencies (Barany col. 14 last paragraph; paragraph 64: "PAGCH is used to allocate a channel to a mobile unit 20 for signaling to obtain a dedicated channel following a request by the mobile unit 20 on PRACH."); and using the randomly selected frequencies to communicate traffic information between the mobile terminal and the base station subsystem (Barany col. 14 lines 57-58, 60-62: random access channel used to request access to system and allocating a channel to a mobile unit following a

request on the random access channel). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the randomly selecting a frequency from each of the plurality of equivalence classes of frequencies; and using the randomly selected frequencies to communicate traffic information between the mobile terminal and the base station subsystem as recited by the instant claims, because the combined teaching of Eswara in view of Almgren and Dent with Barany suggest randomly selecting a frequency from each of the plurality of equivalence classes of frequencies; and using the randomly selected frequencies to communicate traffic information between the mobile terminal and the base station subsystem as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara in view of Almgren and Dent with Barany because Eswara in view of Almgren and Dent suggests communication over frequency (something broad) in general and Barany suggests the beneficial use of random frequency communication (such as already been deployed in a patented system to request access to a mobile unit in Barany col. 14 lines 57-58) in the analogous art of cellular communications. The recitation of the plurality of traffic frequencies is associated with an equivalence class of frequencies and wherein using coordinated frequency hopping over the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem is not given patentable weight since the recitation occurs in the preamble and recites the intended use of a structure and the body of claim does not depend on the preamble for completeness and the bodily limitations are able to stand alone. Thus, the bodily limitations do not require the plurality of traffic frequencies is associated with an equivalence class of frequencies and wherein using coordinated frequency hopping over the plurality of traffic

frequencies to exchange traffic information between the mobile terminal and the base station subsystem as the bodily limitations can be comprised in a cellular system such as the one in Barany.

43. As per claim 32, the method as recited in Claim 19 is discussed above. Eswara in view of Almgren and Dent does not teach wherein the plurality of traffic frequencies comprise the control frequency. Barany teaches wherein the plurality of traffic frequencies comprise the control frequency (Barany paragraph 4 col. 4 lines 4-12: "In one embodiment, the base station 18 and mobile units 20 in each cell 14 are capable of communicating with two sets of carriers--a first set of carriers 26 for communicating circuit-switched traffic (e.g., speech data, short messaging services, and other circuit-switched data) and associated control signals; and a second set of carriers 28 for communicating packet-switched data traffic and associated control signals."). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at plurality of traffic frequencies comprise the control frequency as recited by the instant claims, because the combined teaching of Eswara in view of Almgren and Dent with Barany suggest plurality of traffic frequencies comprise the control frequency as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara in view of Almgren and Dent with Barany because Eswara in view of Almgren and Dent suggests traffic and control frequencies (something broad) in general and Barany suggests the beneficial use of traffic frequencies comprising control frequencies (such as associating traffic data with control signals (Barany col. 4 lines 8-9) for improved communication) in the analogous art of communications.

44. Claims 33, 35, 36, 38, 39, 42, 43, 45, 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eswara in view of Almgren, Dent and Barany.

45. (103) As per claim 33: A computer program product for facilitating communication between a mobile terminal and a base station subsystem, comprising: a computer readable storage medium having computer readable program code embodied therein, the computer readable program code comprising: computer readable program code for assigning a control frequency to a cell in which the mobile terminal is located; computer readable program code for using the control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency; computer readable program code for assigning a plurality of traffic frequencies to the cell in which the mobile terminal is located; and computer readable program code for using coordinated frequency hopping over the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem

46. Eswara teaches the above limitations as discussed with respect to other claims except for computer programming. Eswara also teaches wherein the control information is exchanged during predefined control time slots (Eswara col. 2 lines 10-15: "in a TDMA … cellular system, begins transmitting on a traffic channel … followed by a start measurement … on the … control channel") and the traffic information is exchanged during predefined traffic time slots (Eswara col. 2 lines 10-12: "in a TDMA … cellular system, begins transmitting on a traffic channel").

47. Barany teaches computer programming in paragraph 58 col. 13 lines 16-18 : "The control unit 58 may be implemented with computer systems, processors, and other control devices." Barany also teaches software routines in fig. 9: 76. Thus, it would have been obvious, to one of

ordinary skill in the art, at time the invention was made, to arrive at computer programming as recited by the instant claims, because the combined teaching of Eswara with Barany suggest computer programming as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara with Barany because Eswara suggests communication (something broad) in general and Barany suggests the beneficial use of computer programming for communications (such as storage and routine execution (Barany col. 13 lines 15-30)) in the analogous art of communications.

48. What Eswara does not teach is transmitting a hopping sequence to the mobile terminal using the control frequency. Almgren 6298081 teaches is transmitting a hopping sequence to the mobile terminal using the control frequency (Almgren abstract: "channel allocation means within the base station generates channel hopping sequences that are transmitted via a control channel (SACCH) to hopping sequence lists (204-206) in the mobile stations (MS1-MS3)"). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at wherein the base station subsystem is configured to transmit a hopping sequence to the mobile terminal using the control frequency as recited by the instant claims, because the combined teaching of Eswara with Almgren suggest wherein the base station subsystem is configured to transmit a hopping sequence to the mobile terminal using the control frequency as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara with Almgren because Eswara suggests hopping between beacons (something broad) in general and Almgren suggests the beneficial use of the base station subsystem being configured to transmit a hopping sequence to the mobile terminal

using the control frequency (such as optimizing the use of channels, Almgren col. 4 line 64 to col. 5 line 10) in the analogous art of hopping.

49. Eswara does not teach at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different frequencies. Dent teaches at least one idle time slot (Dent 6011786 fig. 8a,b,c; fig. 5: col. 10 line 61 to col. 11 line 20: unassigned or idle in one of cells i) separates (Dent fig. 5 shows time frames tm+1, tm-1 before and after Ci) at least one of the predefined control time slots (Dent col. 10 lines 19-21: predefined through allocations of time window used to communicate control channel) from at least one of the predefined traffic time slots (Dent col. 10 lines 20-23: time window used to communicate traffic channels; fig. 8a,b,c: has predefined or assigned traffic channels, col. 10 lines 63-64: "assigned to a traffic channel"), which are associated with different frequencies (Dent figs. 8b, 8c; col. 11 lines 8-20: i associated with j and k which are at different frequency bands).

50. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different frequencies as recited by the instant claims, because the combined teaching of Eswara with Dent suggest at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different frequencies as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara with Dent because Eswara suggests control and traffic data (something broad) in general and Dent suggests the beneficial use of

having an unassigned or idle time slot between control and traffic data to more easily acquire a channel and increase gain by not succumbing to loss and fading (Dent col. 10 line 61 to col. 11 line 20) in the analogous art of cellular systems.

51. (103) As per claim 35, the computer program product as recited in Claim 33, wherein the coordinated frequency hopping is cyclical (discussed above).

52. (103) As per claim 36, the computer program product as recited in Claim 33, wherein the coordinated frequency hopping is random (discussed above).

53. (103) As per claim 38, the computer program product as recited in Claim 33, wherein the computer readable program code for transmitting the hopping sequence to the mobile terminal using the control frequency comprises: computer readable program code for transmitting the hopping sequence to the mobile terminal using a primary packet broadcast control channel (PBCCH), which is defined by the control frequency and at least one time slot (discussed above).

54. (103) As per claim 39, the computer program product as recited in Claim 33, wherein the plurality of traffic frequencies and the control frequency are mutually exclusive (discussed above).

55. (103) As per claim 42, the computer program product as recited in Claim 33, wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of traffic frequencies (discussed above).

56. (103) As per claim 43, the computer program product as recited in Claim 42, wherein the traffic frequencies are non-contiguous and are each separated, one from another, by at least one of the frequencies associated with the auxiliary cellular communication system (discussed above).

57. As per claim 45, the computer program product as recited in Claim 33, wherein each of the plurality of traffic frequencies is associated with an equivalence class of frequencies and wherein the computer readable program code for using coordinated frequency hopping over the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem comprises: computer readable program code for randomly selecting a frequency from each of the plurality of equivalence classes of frequencies; and computer readable program code for using the randomly selected frequencies to communicate traffic information between the mobile terminal and the base station subsystem. (discussed above)

58. (103) As per claim 46, the computer program product as recited in Claim 33, wherein the plurality of traffic frequencies comprise the control frequency. (discussed with Eswara and Barany such as Barany paragraph 4: "In one embodiment, the base station 18 and mobile units 20 in each cell 14 are capable of communicating with two sets of carriers--a first set of carriers 26 for communicating circuit-switched traffic (e.g., speech data, short messaging services, and other circuit-switched data) and associated control signals; and a second set of carriers 28 for communicating packet-switched data traffic and associated control signals.")

59. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eswara in view of Almgren.

60. As per claim 48, a cellular communication system, comprising: a base station subsystem; and a mobile terminal that is configured to use a control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency, and is configured to use coordinated

frequency hopping over a plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem; wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of traffic frequencies. (discussed with Eswara)

61. Eswara does not teach frequency hopping based on a hopping sequence. Almgren 6298081 teaches frequency hopping based on a hopping sequence (Almgren abstract: "generates channel hopping sequences that are transmitted via a control channel"). It would have been obvious to one skilled in the art at the time of the invention to modify Eswara with Almgren's frequency hopping based on a hopping sequence. One would be motivated to do so for the reasons taught in Almgren col. 4 line 64 to col. 5 line 10 such as to optimize the use of channels.

62. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at frequency hopping based on a hopping sequence as recited by the instant claims, because the combined teaching of Eswara with Almgren suggest frequency hopping based on a hopping sequence as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Eswara with Almgren because Eswara suggests hopping between beacons (something broad) in general and Almgren suggests the beneficial use of frequency hopping based on a hopping sequence (such as optimizing the use of channels, Almgren col. 4 line 64 to col. 5 line 10) in the analogous art of hopping.

63. Claim Rejections - 35 USC § 102

64. Claim 50 is rejected under 35 U.S.C. 102(e) as being anticipated by Barany et al. 6256486.

65. As per claim 50, a method of communication between a mobile terminal and a base station subsystem, comprising: assigning a control frequency to a cell in which the mobile terminal is located (Barany col. 14 last paragraph: "… control channels … provide general information on a per base station basis … including information employed for mobile units 20 to register in the system 10"); using the control frequency to exchange control information between the mobile terminal and the base station subsystem (Barany col. 14 last paragraph: control information for control frequencies; PCCCH includes PRACH for uplink – mobile to base), the exchange of control information being constrained to the control frequency (Barany paragraph 4: "In one embodiment, the base station 18 and mobile units 20 in each cell 14 are capable of communicating with two sets of carriers--a first set of carriers 26 for communicating circuit-switched traffic (e.g., speech data, short messaging services, and other circuit-switched data) and associated control signals; and a second set of carriers 28 for communicating packet-switched data traffic and associated control signals."); assigning a plurality of traffic frequencies to the cell in which the mobile terminal is located (Barany col. 15 lines 7-9: "… data traffic channels … and associated traffic control channels …" are assigned to the mobile - Barany col. 14 last paragraph), each of the plurality of traffic frequencies being associated with an equivalence class of frequencies (Barany figs. 2, 3, 10, 11: hopping between various frequencies while moving between coverage areas; these frequencies are in a hopping class such that any can be hopped to equivalently if conditions such as interference, signal strength etc. are equivalent); randomly (Barany col. 14 lines 55-56: random access channel) selecting a frequency from each of the plurality of equivalence classes of frequencies (Barany col. 14 last paragraph; paragraph 64: "PAGCH is used to allocate a channel to a mobile unit 20 for signaling to obtain a dedicated

channel following a request by the mobile unit 20 on PRACH."); and using the randomly selected frequencies to communicate traffic information between the mobile terminal and the base station subsystem (Barany col. 14 lines 57-58, 60-62: random access channel used to request access to system and allocating a channel to a mobile unit following a request on the random access channel)

66. Allowable Subject Matter

67. Claims 27, 30, 41, 44, 49 are allowed. Reasoning is provided in prior action(s).

68. Conclusion

69. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pankaj Kumar whose telephone number is (571) 272-3011. The examiner can normally be reached on Mon, Tues, Thurs and Fri after 8AM to after 6:30PM.

70. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

71. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

72.

Pankaj Kumar

73. Pankaj Kumar
74. Patent Examiner
75. Art Unit 2631

76. PK